REMARKS

By the present amendment, claims 1, 3 to 9 and 18 to 25, 28 and 29 are pending in the application. Claim 1 is the only independent claim.

Claim Amendments

Claim Amendments

Support for steel plate may be found in the specification, e.g., as follows. All of the examples of the present invention in the specification are disclosed as a steel plate. See, e.g., page 45, line 30. In Table 2, at page 54, the next to last column is directed to "steel plate thickness". Steel plates are also discussed, e.g., at page 19 and page 22, lines 32-33.

A steel plate having a thickness of 40 mm or less is disclosed in Table 2, at page 54, next to last column, wherein the thickness of the steel plates of the examples of the invention are 40 mm or less for all the examples except for examples A5, A8 and A25.

The relationship for Solute Mo + Solute W is disclosed in prior, now canceled, dependent claim 2. See also, e.g., specification page 31, lines 31 to 35.

§102/§103

Claims 1 to 5, 7, 9, 18, 21, 22 and 28 were rejected under 35 U.S.C. §102(b) as being anticipated by Japan No. 10-017929.

Claims 6, 8, 19, 20, 23, 24, 25 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Japan No. 10-017929 in view of Japan No. 2001-214236.

These rejections, as applied to the amended claims, are respectfully traversed.

The Present Invention

The present invention provides a crude oil tank, with the crude oil tank fabricated from a steel plate for a welded structure to be used for a crude oil tank. The steel

plate of the present invention exhibits excellent local corrosion resistance in the environment of the floor plate of a crude oil tank and a decreased rate of formation of a corrosion product containing solid sulfur in a gas phase at the reverse side of the upper deck plate of a crude oil tank.

The present invention discovered that the concentration of rock salt brine, which varies in accordance with the oil field and the depth of an oil well from which the crude oil came, is as high as roughly 1 to 60 mass % in terms of an Na-Cl-reduced concentration. Further, the present invention discovered that when a steel plate is exposed to such a high-concentration brine, or a high-concentration of an aqueous solution of halogen, the steel plate surface becomes uneven because of the sediment of corrosion products, e.g., sludge. This is caused by solid sulfur which precipitates as a result of a reaction of hydrogen sulfide and oxygen in a gas phase in a crude oil tank, with iron rust on the surface working as a catalyst, ash and the like.

The present invention targets to enhance corrosion resistance, or resistance to general corrosion and sludge formation, in the environment in question by not adding Cr, but by adding Cu of more than 0.1% and Mo in combination, by respectively defined amounts of Cu and Mo, and optionally W, and limiting the amount of P and S, on the basis of the chemical composition of a welded structure, as shown in Fig. 1 of the specification. More specifically, it was discovered that a small amount of Mo remarkably decreases the local corrosion rate in case of Fe-Cu-Mo steel as shown in Fig. 1. Regarding the effect of W, it is also a new discovery that a small amount of W is effective to decrease the local corrosion rate.

Patentability

Japan No. 10-017929 ("JP '929")

JP '929 discloses the production of thick 600N/mm^2 class steel plate having a thickness of more than 50 mm and containing Nb and V which is excellent in weldability and toughness in center part of the plate thickness.

1) Regarding use of the steel plate, the steel plate of JP '929 is used in a gas tank. On the other hand, the steel plate according to the present invention is used in a crude oil tank. This means that use of the steel plate is in a different atmosphere in JP '929.

2) Regarding solute Mo and solute W, the specification of the present invention discloses at page 31, line 20 to page 32, line 5 as follows:

> "While [Mo: 0.01 - 0.1% and W: 0.01 - 0.5% are essential requirements], in order to achieve the effect of improving local corrosion resistance more efficiently, it is necessary to secure more than a certain amount of Mo and W in solid solution while their contents are maintained within these ranges. This is because, when either Mo or W forms coarse precipitates, portions depleted of the element are formed around the precipitates and the effect of improving local corrosion resistance is impaired. For this reason, it is necessary that either Mo or W be distributed in a steel plate as uniformly as possible. Solute Mo and W have substantially identical effects on local corrosion resistance, and as long as the total amount of both elements in solid solution is 0.005% or more, local corrosion resistance is greatly improved. It is not necessary to specify an upper limit of the total amount of the solute Mo and W for obtaining the effects of the present invention. On the other hand, a steel plate is strengthened by solid solution, and in order to obtain an adequate strength economically, it is desirable to set the upper limit of the total amount of both the elements in solid solution at 0.5% or less."

Therefore, the present invention defines Solute Mo + Solute W $\geq$ 0.005%.

On the other hand, JP '929 does not disclose or suggest the significance of solute Mo and solute W.

Regarding the production process, the present invention defines three processes for achieving Solute Mo + Solute W $\geq$ 0.005%. That is:

(1) TCPM

Carrying out an accelerated cooling as claimed in original claim 10.

Carrying out tempering or annealing at a temperature less than 500°C after the accelerated cooling as claimed in original claim 11.

(2) Normalizing

Carrying out normalizing as claimed in original claim 12.

Carrying out tempering or annealing at a temperature less than 500°C after normalizing as claimed in original claim 13.

(3) Diffusion Heat Treatment

Applying diffusion heat treatment to a slab at a heating temperature of 1200 - 1350°C for 2 to 100 Hr of retention time as claimed in original claim 14.

On the other hand, JP '929 discloses a direct quenching and tempering, where tempering is carried out more than 550°C, and tempering of all of the examples including example H are carried out 580 - 680°C. However, these tempering temperatures of JP '929 are different temperatures from those of the present invention which defines less than 500°C. JP '929 does not disclose or suggest the above mentioned three conditions for achieving Solute Mo + Solute W $\geq$ 0.005% in accordance with the present invention.

Regarding the steel plate thickness, the present inventive steel plate is used for an oil tank of a crude oil carrier, or an above ground or an under ground crude oil tank. It is well known that a steel plate having a thickness of more than 40 mm cannot be used as crude oil carrier. In case of an above ground or an under ground crude oil tank, it is necessary to apply post heat treatment after welding (PWHT) in accordance with the increased thickness.

Therefore, the present invention limit the thickness to 40 mm or less, which is different than the steel plate thickness of more than 50 mm defined in JP '929.

Japan No. 2001-214236 ("JP '236")

JP '236 relates to a corrosion resistant steel for crude oil and heavy oil storage sheds containing one or more of Cu, Ni, Cr, Mo, Sb or Sn.

However, JP '236 does not contain W and does not disclose or suggest using solute Mo and solute W. JP '236 also does not disclose or suggest Solute Mo + Solute W $\geq$ 0.005%.

Therefore, JP '236 cannot be combined with JP '929 which has no inventive idea of Solute Mo + Solute W $\geq$ 0.005% even if JP '236 discloses a steel plate used for crude oil and heavy oil storage sheds.

It is therefore submitted that amended independent claim 1, and all claims dependent thereon, are patentable over JP '929 standing alone or in combination with JP '236.

CONCLUSION

It is submitted that in view of the present amendment and foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application, as amended, be allowed and passed for issue.

Respectfully submitted,

KENYON & KENYON LLP

By: John J. Kelly, Jr.
John J. Kelly, Jr.
Reg. No. 29,182

Dated: June 11, 2009

KENYON & KENYON LLP
One Broadway
New York, NY 10004
Telephone No. (212) 425-7200
Facsimile No. (212) 425-5288
CUSTOMER NO. 26646